Indexes as an Instrument for Measuring Social Inequalities in Higher Education

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❑ Despite the worldwide trend of expanding participation in higher education (HE) (Schofer and Meyer 2005), no unambiguous answer has yet been provided as to how this expansion has impacted on inequalities in HE.

   ✓ On the one hand, it is acknowledged that HE 'is becoming more socially inclusive at a rapid rate and on a worldwide scale' (Marginson, 2016, p. 34).

   ✓ However, on the other hand, a large number of studies reveal the stable and persistent effects of socio-economic status on school success and access to HE (eg. Blossfeld & Shavit, 1993; Lucas, 2001; Pfeffer, 2008; Ilieva-Trichkova & Boyadjieva, 2014; Boliver, 2017; Borgonovi et al., 2020).

❑ These divergent views reflect not only the real processes in the development of HE, but also the different ways in which inequalities are conceptualized and measured.

❑ It seems that, as both the context of HE and its institutions have become more heterogeneous, there is a need for more complex measures and instruments to be used in the analysis of inequalities in HE and their dynamics.
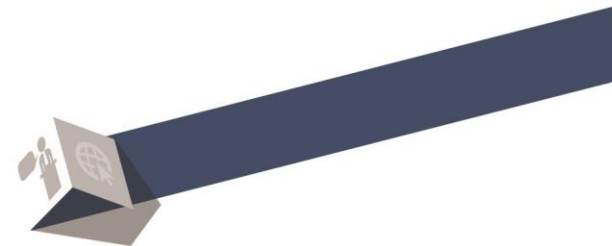
Aims

1) *to explore the potential and advantages of indexes as an instrument for measuring inequalities in HE;*

2) *to critically discuss challenges related to the use of these indexes;*

In addressing these aims, this paper tries to contribute to the efforts of HE researchers to foster a methodology discourse in comparative HE (e.g., Kosmützky and Nokkala 2020).

We regard HE as a complex and multidimensional phenomenon. Here, we focus on three aspects, which are important for studying inequalities in HE:

❑ *Inclusion*

The inclusion perspective "focuses on growth in the absolute number of people from hitherto under-represented socioeconomic groups, as defined in terms of income measures or social or occupational status" (Marginson, 2011, pp. 23–24).

❑ *Fairness*

The fairness perspective "implies ensuring that personal and social circumstances – for example gender, socio-economic status or ethnic origin – should not be an obstacle to achieving educational potential" (Santiago et al., 2008, pp. 13–14). It stresses the proportional distribution of student places (or graduations) between different social groups (Marginson, 2011, pp. 23–24).

❑ *HE as a public good*

Boyadjieva and Ilieva-Trichkova (forthcoming) argue that HE could be defined as a public good based on the assessment of the extent to which an increasing number of people do not experience difficulties to access, participate and complete HE and of the country's attempts to encourage participation of all.
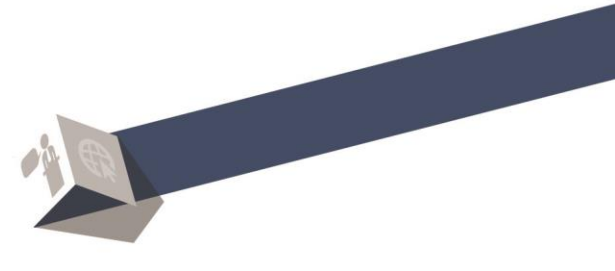
Data

- ❑ European Social Survey (ESS)
- ❑ EUROSTUDENT survey &
- ❑ Official statistics (e.g., Eurostat).

Measures

- ❑ *Index of inclusion in HE* - it measures the trends towards greater or lesser inclusion of a given social group in HE within a given country over time.

- ❑ *Index of fairness in HE* - it is built upon Usher and Medow's equity index (2010) and measures how the fairness of representation among a given social group in HE within a given country has changed over time.

- ❑ *Index of HE as a public good* -it measures the extent to which HE as a public good is being realised in a given country.

❑ For its calculation, we estimated logistic regression models separately for all 14 countries. The dependent variable which we have used distinguishes ***whether or not people aged 20–34 had a tertiary education degree.***

❑ The main independent variable is parents' highest educational attainment level within two categories: without a tertiary education background (ISCED 0–4) and with a tertiary education background (ISCED 5–8).

❑ We included the ESS round, gender, and age as control variables in the models.

❑ The models were calculated for 2 temporal points:
   o   cumulated data from the ESS (R7 & 8) and
   o   cumulated data from the ESS (R9 & 10).

❑ Based on these logit models, we derived their so-called marginal effects – which indicate the predicted probabilities of people with tertiary and non-tertiary education backgrounds to have a tertiary degree. Then we calculated the ratio between these probabilities for the time period falling within the two selected temporal points.

❑ This ratio ranges from 0 to infinity.

   > 1 - increased inclusion of a given social group within one and the same country over time.

   < 1 - a tendency towards exclusion of this group over time.

   = 1 - no change was made regarding the inclusion of this group.

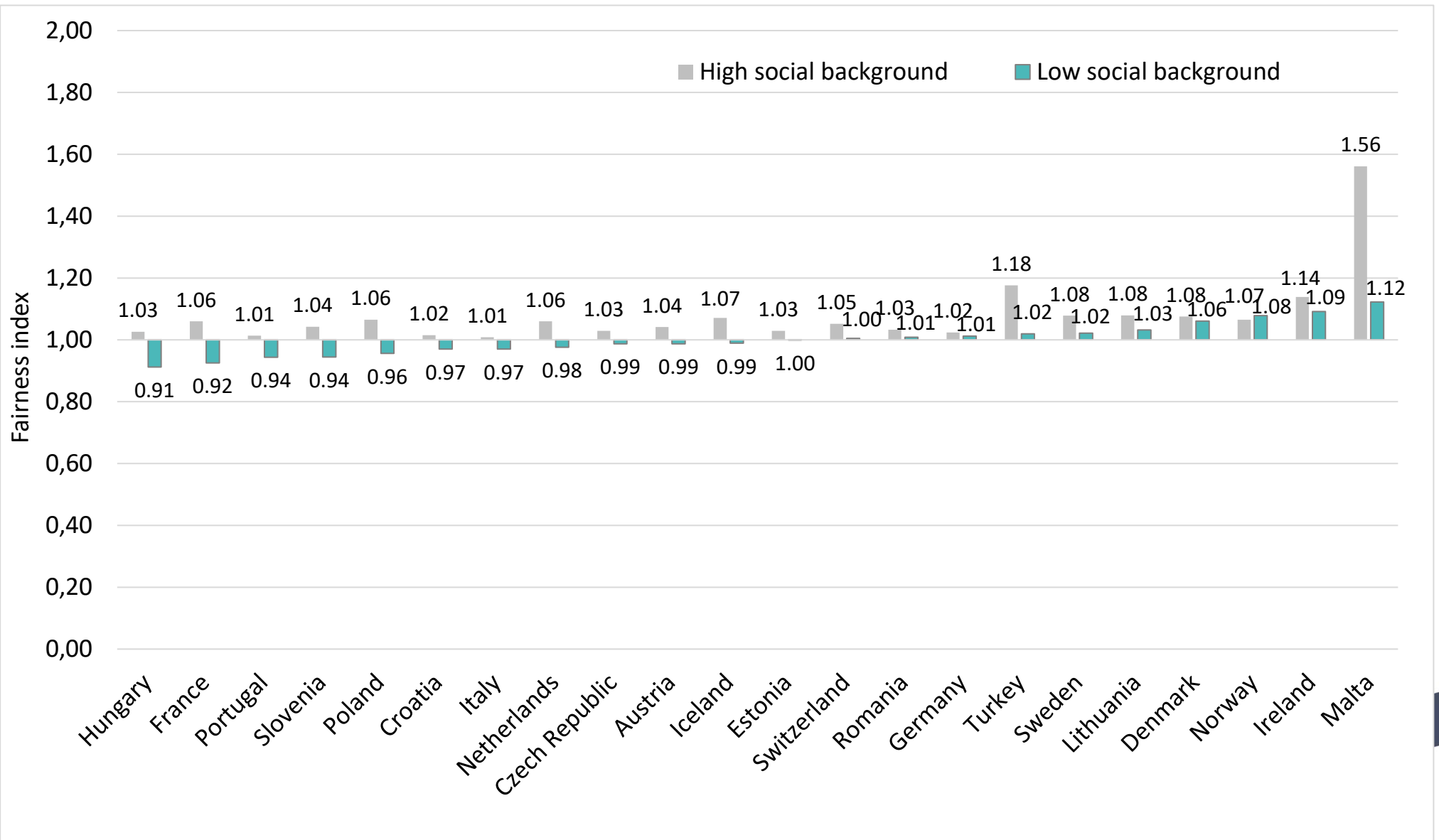Index of inclusion in HE for people of low and high social background
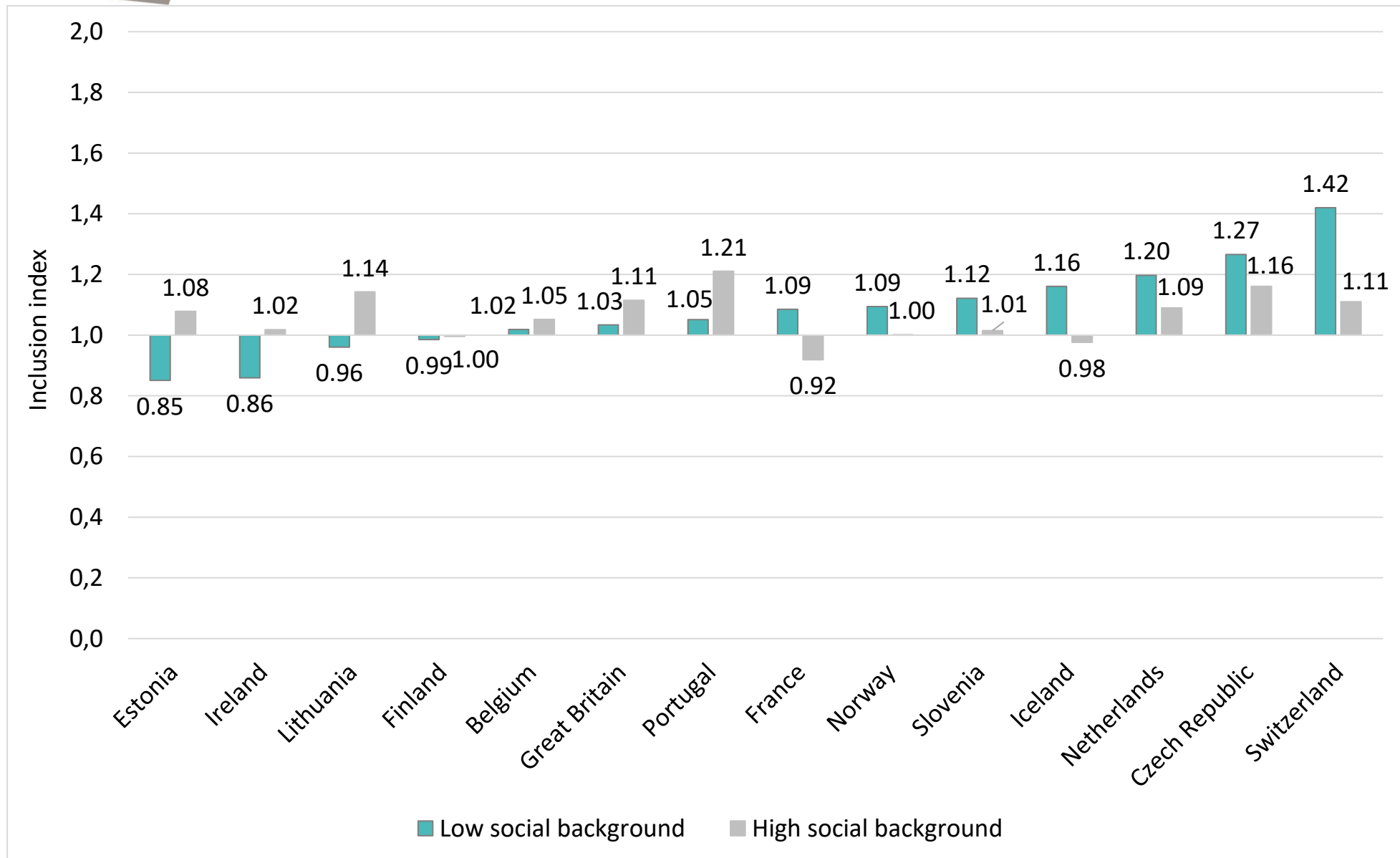
- ❑ It is calculated as the ratio between fairness indicators of representation among particular social group at two temporal points – in our case, 2016 and 2019 for 22 countries.
- ❑ We apply it regarding the tertiary education background group, this index measures the ratio between the percentage of all people aged 45–64 with a high level of education in the overall population and the percentage of all students who have at least one parent who has completed HE, calculated at 2 temporal points.
- ❑ As for the social group with non-tertiary education backgrounds, this formula is reversed. To account for the levels of education in a given country's general population, we used data from Eurostat on people aged 45–64 with high levels of education (ISCED 5–8) and lower levels (ISCED 0–4) as of 2016 and 2019. The data about students' parental educational levels were taken from EUROSTUDENT VI & VII.
- ❑ The score of fairness of representation in HE varies between 0 and 1. The closer the score is to 1, the fairer the system; and vice versa.
- ❑ For the fairness index, we calculated the ratio between the scores for a given social group at two temporal points:

> 1 - increased fairness of representation among a given social group within one and the same country within the above-described period of time;

< 1 - a tendency towards less fairness for this group over time.

= 1 - no change was made regarding fairness for this group.

Index of fairness in participation in HE for people of low and high social background for the period 2016 and 2019


Legend: High social background, Low social background

Y-axis: Fairness index (2,00 / 1,80 / 1,60 / 1,40 / 1,20 / 1,00 / 0,80 / 0,60 / 0,40 / 0,20 / 0,00)

Country	High social background	Low social background
Hungary	1.03	0.91
France	1.06	0.92
Portugal	1.01	0.94
Slovenia	1.04	0.94
Poland	1.06	0.96
Croatia	1.02	0.97
Italy	1.01	0.97
Netherlands	1.06	0.98
Czech Republic	1.03	0.99
Austria	1.04	0.99
Iceland	1.07	0.99
Estonia	1.03	1.00
Switzerland	1.05	1.00
Romania	1.03	1.01
Germany	1.02	1.01
Turkey	1.18	1.02
Sweden	1.08	1.02
Lithuania	1.08	1.03
Denmark	1.08	1.06
Norway	1.07	1.08
Ireland	1.14	1.09
Malta	1.56	1.12

Index of AE as a public good
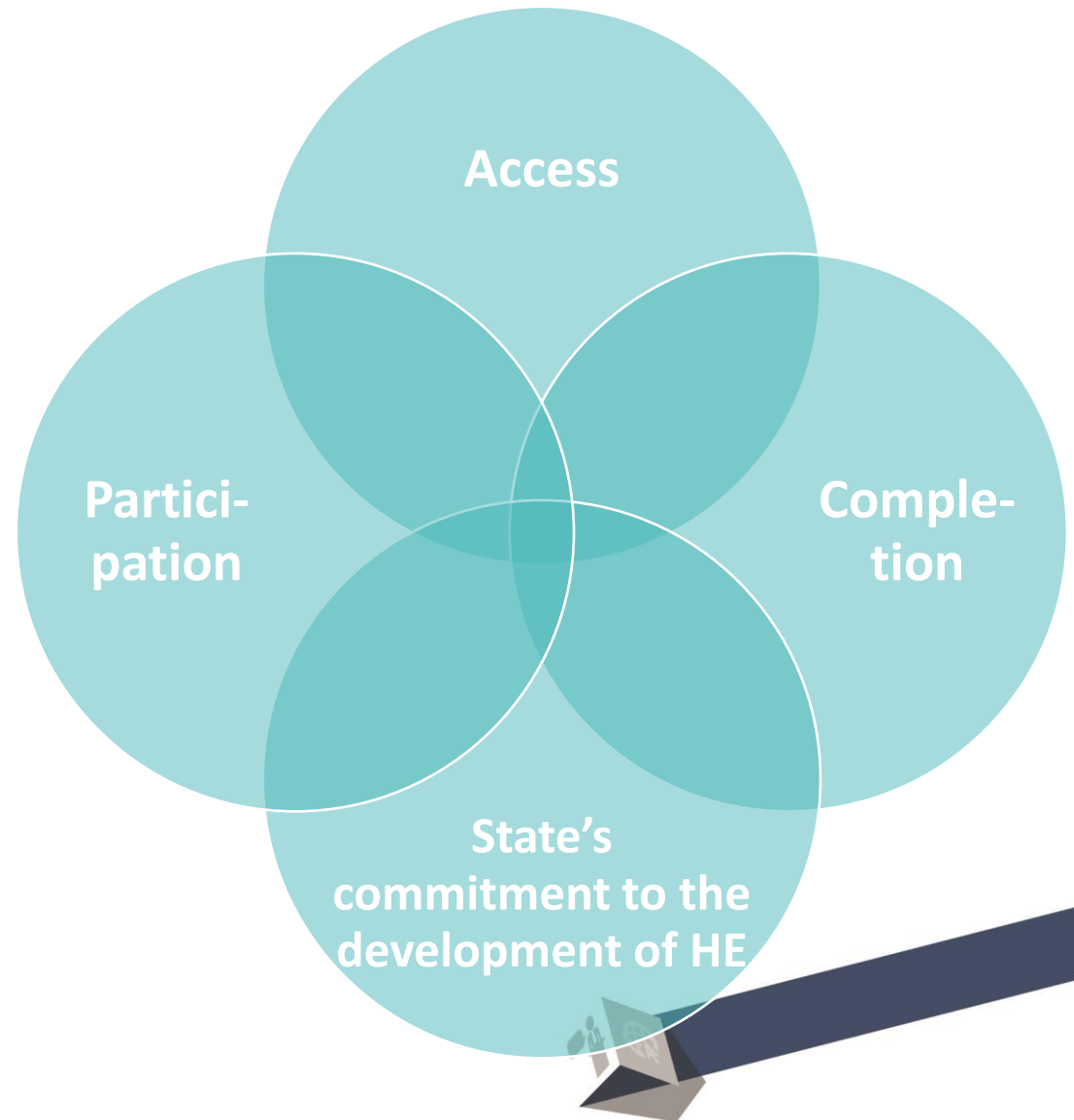
Calculated following Lessenski (2016) -

methodology.

Ranges between 0 and 100.

It includes four sets of indicators

which refer to:
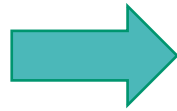
Cronbach Alpha: (four items: α = 0.55).

The model fit indicators (CFI = 1.00; RMSEA = 0.00, and SRMR = 0.043). indicate that it has a reasonably good fit.

Access

Partici-
pation

Comple-
tion

State's
commitment to the
development of HE

Description of the dimensions and indicators of the index of HE as a public good

Dimension	Indicator	Description	Source/ Time frame	Weight
Access	Difficulties due to job obligation by extent of working	Self-assessed experience of current difficulties in studies due to job obligation. Share of students (in %). Reversed	Hauschildt et al. (2021, 154)	12.25
	Reasons for working	I work to cover my living costs. Share of students (in %). Reversed	Hauschildt et al. (2021, 139)	12.25
Participation	Students' sense of lack of belonging to HE	(Strong) agreement with the statement 'I often have the feeling that I don't really belong in higher education'. Share of students (in %). Reversed	Hauschildt et al. (2021, 71)	8.33
	Students' drop-out intention	Share of students agreeing with the statement 'I am seriously thinking of completely abandoning my higher education studies' (in %). Reversed	Hauschildt et al. (2021, 72)	8.33
	Students' assessment of their financial situation.	Those who reported (in %) "not at all" and "slight" when answering the question: "To what extent are you currently experiencing financial difficulties?"	Hauschildt et al. (2021, 185)	8.33
Completion	Graduates aged 30–34	Tertiary educational attainment in the 30–34 age group (in %)	Eurostat (2020) Data code: edat_lfse_03 Extracted on 27.07.2024	12.25
	Education Equality Index (EEI)	It is calculated as the ratio between the % of all males 45–64 with higher educational degrees and the % of all students whose fathers have higher educational degrees (Usher and Medow 2010), multiplied by 100. It ranges from 0 to 100, where 0 means absolutely no equity in higher education and 100 corresponds to complete equity at country level	Own calculations based on data from Hauschildt et al. (2021, 302) and Eurostat (2020) Data code: edat_lfse_03 Extracted on 27.07.2024	12.25
State's commitment to the development of HE	Percentage of GDP spent on tertiary education	Public expenditure on tertiary education as a percentage of GDP	Eurostat (2020) Data code: educ_uoe_fine06 Extracted on 27.07.2024	12.25
	Financial aid	Financial aid to students as % of total public expenditure for tertiary education (levels 5-8)	Eurostat (2020) Data code: educ_uoe_fina01 Extracted on 26.07.2024	12.25

Index of HE as a public good
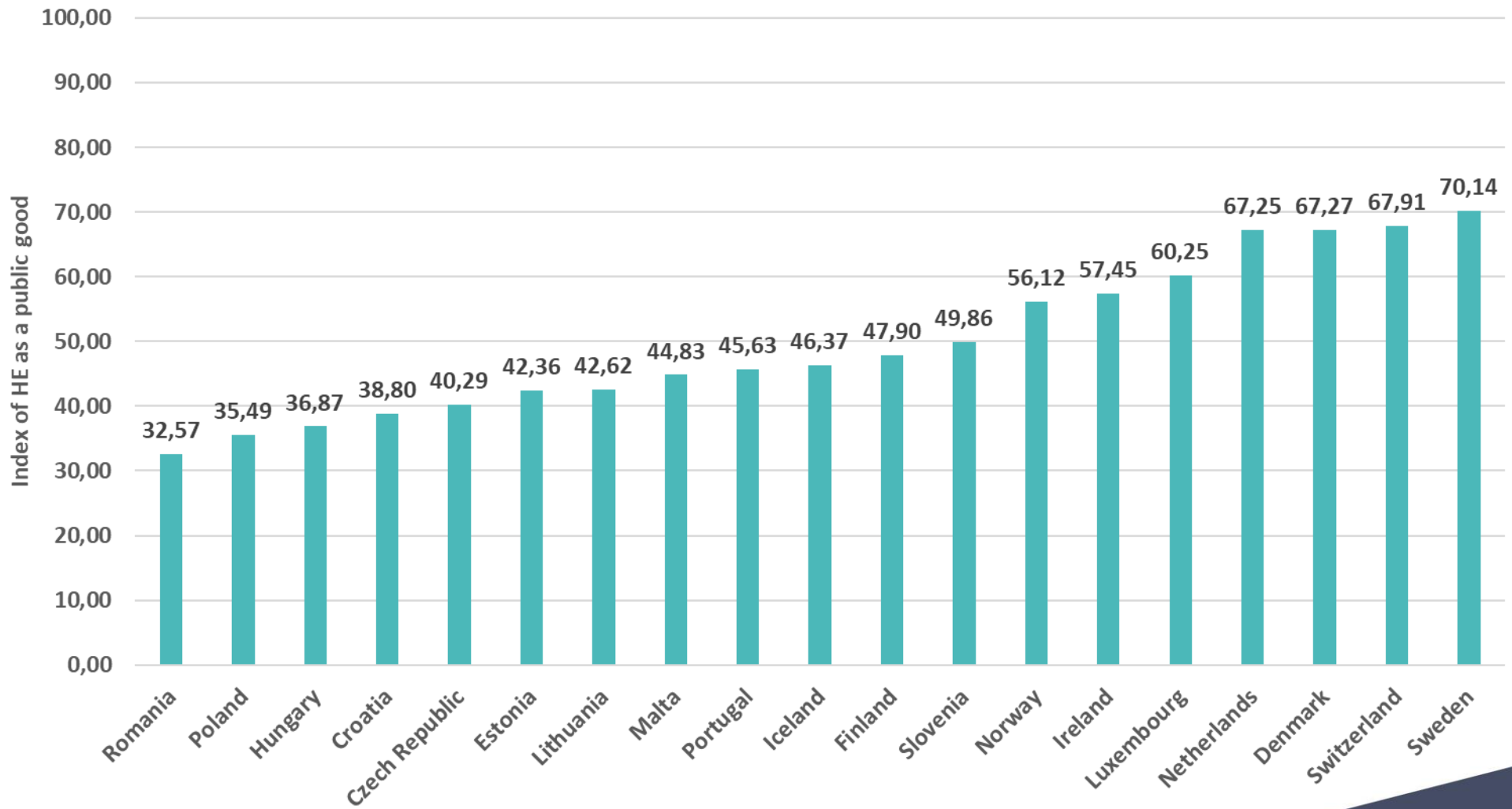
Index of HE as a public good — overall score (rank) and dimensions scores

Country	Overall score (rank)	Access	Participation	Completion	State's commitment to the development of HE
Sweden	70.14 (1)	76.05	71.80	58.38	74.34
Switzerland	67.91 (2)	82.03 (1)	80.23 (1)	68.20 (4)	41.20 (12)
Denmark	67.27 (3)	60.27	71.23	47.62	89.96
Netherlands	67.25 (4)	70.37	66.57	62.22	69.85
Luxembourg	60.25 (5)	76.75	62.06	75.42	26.75
Ireland	57.45 (6)	53.83	39.17	78.33	58.47
Norway	56.12 (7)	39.89	47.43	52.73	84.44
Slovenia	49.86 (8)	58.89	47.28	47.01	46.28
Finland	47.90 (9)	16.73	58.15	66.07	50.66
Iceland	46.37 (10)	25.45	42.77	63.22	54.02
Portugal	45.63 (11)	49.36	54.76	38.22	40.18
Malta	44.83 (12)	49.78	33.47	43.64	52.41
Lithuania	42.62 (13)	32.52	31.36	69.72	36.87
Estonia	42.36 (14)	21.74	62.83	47.33	37.56
Czech Republic	40.29 (15)	64.82	40.49	25.29	30.57
Croatia	38.80 (16)	44.67	48.65	27.05	34.82
Hungary	36.87 (17)	49.59	31.48	23.31	43.10
Poland	35.49 (18)	38.07	15.95	45.77	42.19
Romania	32.57 (19)	39.19	44.31	10.46	36.33

❑ *Availability of data from large-scale international surveys serving as an empirical basis for the development of indexes*

o Various indexes for measuring inequalities in HE can be best developed based on primary data collected following variety of theoretical perspectives specifically relevant to the conceptualization and explanation of educational inequalities. Importantly, however, such indexes for inequalities in HE can also be based on data from available large-scale international surveys such as the EUROSTUDENT, ESS, LFS, etc. as well as from 'big data' (Boeren and Lido 2023). Although not based on specific theoretical perspectives, they provide rich secondary data and are relatively easy to access. Data from these surveys are freely available upon application.

o Secondary data can be a valuable source of knowledge and insights into a broad range of issues and phenomena and can provide a cost-effective way of addressing important issues in HE.

o The comparison of similarities and differences across HE systems, which the index calculation could facilitate, can also enable researchers to find more general patterns of phenomena within HE and, consequently or simultaneously, in other domains of society or public policy.

❑ *Comparative perspective*

o   Data from cross-national surveys allow for the adoption of a wide comparative perspective and enable comparisons of the indexes across countries. These surveys provide cross-national data, rather than panel data; there are no overlaps of interviewees, as a new sample of population is drawn for each wave.

o   They facilitate comparisons across countries by using the same source questionnaire for all participants. Some of the questions follow international standard classifications which allow comparisons across diverse country settings, as for example, the International Standard Classification of Education (ISCED) and the International Standard Classification of Occupations (ISCO).

o   Being subject to continuous improvement, they provide useful tools for applying a comparative perspective to the study of inequalities in HE.
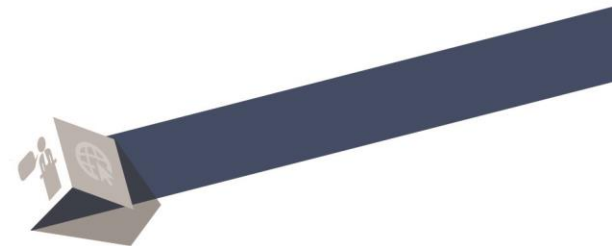
❑ *Social embeddedness*

- o Indexes allow placing the studied phenomena in a wider social context and revealing their social embeddedness. For example, elsewhere we show the association between the index of adult education as a common good and different measures accounting for the various political, economic, and cultural contexts at country level, such as the Democracy index, GINI index, degree of individualism and the level of generalized trust (Boyadjieva and Ilieva-Trichkova 2021).

- o With regard to this embeddedness of inequalities in HE, there are examples of measures focussing on welfare regimes (Thomsen 2015; Willemse and de Beer 2012).

❑ *Dynamic perspective*

- o The indexes enable adopting a dynamic perspective on changes in inequalities in HE over time. Thus, it this possible to outline trends over time in inclusion and fairness of HE systems and in the realisation of HE as a public good.
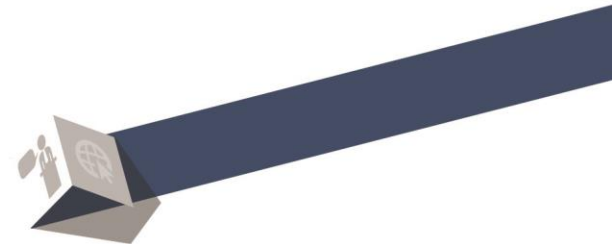
❑ *"Imperialism" of international surveys*

- o As far as international surveys use one core questionnaire in a large number of countries, which may differ significantly in economic, political, or cultural perspectives, these surveys may, as it were, "impose" their definitions and ways of thinking. Eg. Grotlüschen and Buddeberg (2020, p. 168), study the so-called process of Southering. They "investigate whether PIAAC—and this might relate to other international surveys as well—unwillingly reinforce inadequate assumptions about 'South'" and "examine different aspects of data collection and display of findings", as well as "aspects in which stereotyping can take place". This implies the "export" of Northern definitions and instruments to the South (Ibid., p. 177).

- o It has also been observed that the active practice of inequality research has increased in recent times, alongside critiques of those HE institutions systems (mainly in the Global North) which are highly marketized, largely based on neo-liberal values and imperial and colonial attitudes (e.g. Andreotti et al. 2015; Deem et al. 2022). These trends seem to lie out of the scope of international surveys.
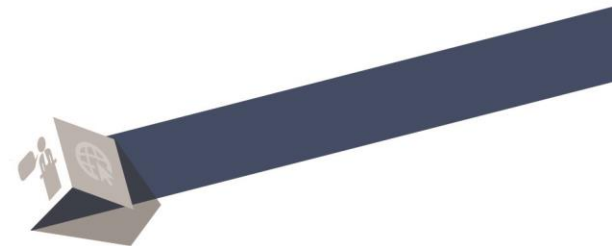
❑ *Reliability and validity*

- o Seeber (2020, pp. 162–163) "focuses on the distinct challenges emerging in higher education research when quantitative and comparative approaches are combined". Thus, cross-cultural research has important methodological aspects that should also be taken into account when developing multidimensional scales and indexes for measuring inequalities in HE, especially when they are based on questionnaires for primary data collection.

- o He and van de Vijver (2012) focus on two key concepts: bias and equivalence. Whereas bias refers to nuisance factors that jeopardize the validity of instruments applied in different cultures, equivalence refers to the level of comparability of scores across cultures; these authors suggest that comparative researchers should develop or rely on indicators— and related measures—that are not *biased* and are *equivalent* (He and van de Vijver 2012).

- o Non-equivalence is an important issue in large international surveys. It may be due to linguistic problems or cultural factors.

- o Another set of problems refers to the heterogeneity of HE in different countries. However, it seems that developing a questionnaire scale is a challenging process involving many theoretical and statistical steps that must be taken to ensure theoretical validity and empirical reliability, which may not always be very straightforward.

❑ *Fluid theoretical considerations*

- o A real challenge facing the development of indexes and their application for measuring inequalities stems from the changes in the theoretical understanding of the main concepts on which different indicators are based. Thus, every change in the surveys' concepts or methodology creates risks for cross-time comparisons. For instance, breaks may occur in time series due to changes of methodology, such as formulation of the questions, changes in the classifications used or in the answer scales.

❑ *Statistical "burden"*

- o Despite the existence of guidelines for how to construct composite indexes and multiple ways to measure inequalities (e.g., OECD 2018; Antoninis et al. 2016), the process of developing indexes is "burdened with sophisticated statistical and technical procedures and language. That is why it is often a challenge to 'translate' statistical analyses for wider audiences".
- o Gorur (2017, p. 345) highlights that "[s]tatistics are also sometimes seen as technically so complex that they cannot be understood or fruitfully challenged by those not expert in that field" and that non-experts "go by numbers without an appreciation of all that lies beneath those numbers" (Gorur 2015, p. 589).

❑ This paper has shown that indexes could serve as a useful instrument for measuring inequalities in HE as they allow capturing different dimensions of, and phenomena related to, HE and allow comparison over time and across countries.

❑ At the same time, we discussed the challenges that accompany calculation of indexes, ensuing from lack of data for certain dimensions or for some countries or the fact that surveys used in calculating complex indexes rely on self-reporting data, which may raise doubt about the correctness of the data.

❑ Still, it is important to emphasise that authors expressing criticism towards large international surveys related to educational research do not aim to question their legitimacy (Grotlüschen and Buddeberg 2020) and that such surveys are considered worthwhile (Boeren 2019) as their advantages outweigh their limitations (Gorur 2017).
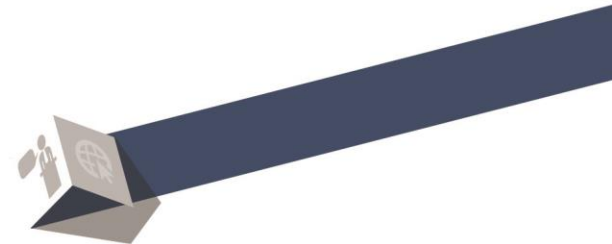
❑ There is a need to articulate clear messages for broad policy audiences and to achieve greater consensus among scholars and policy-makers around the world as to which education indicators, inequality measures, individual characteristics and data sources should be emphasised (Antoninis et al. 2016).

❑ Any use of indexes for policy making should always take into account the specificities of different national contexts, relating both to the HE system and to the wider social environment.
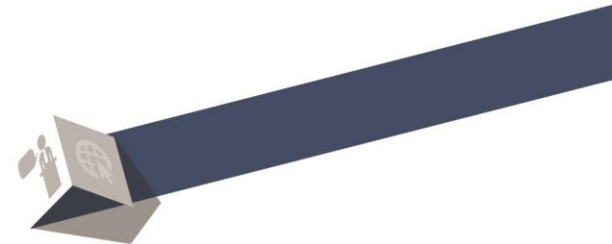
THANK YOU FOR YOUR ATTENTION!

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